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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/677,099	09/30/2003	Haoren Zhuang	14580-035001	4095
20985	7590	01/10/2005	EXAMINER	
FISH & RICHARDSON, PC 12390 EL CAMINO REAL SAN DIEGO, CA 92130-2081			HOANG, QUOC DINH	
			ART UNIT	PAPER NUMBER
			2818	

DATE MAILED: 01/10/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/677,099	Applicant(s) ZHUANG ET AL.	
	Examiner Quoc D Hoang	Art Unit 2818	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
 - If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
 - If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
 - Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 15 October 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-23 and 47 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-23 and 47 is/are rejected.
- 7) ☒ Claim(s) 1 and 22 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Election/Restrictions

1. Applicant's election of Group II (claims 1-23 and 47) with traverse in the reply filed on 10/15/2004 is acknowledged. Because applicant did not distinctly and specifically point out the supposed errors in the restriction requirement, the election has been treated as an election without traverse (MPEP § 818.03(a)).

Claim Objections

2. Claim 1 is objected to because of the following informalities: in claim 1, line 4, the term "through said substrate" should be --through said first interlayer dielectric layer--. Appropriate correction is required.
3. Claim 22 is objected to because of the following informalities: Claim can not depend on itself. Appropriate correction is required.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 1-3, 6, 7, 13, 19 and 47, as best understood rejected under 35 U.S.C. 102(b) as being anticipated by Fazan et al (US Pat No. 6,259,125) ("Fazan").

Regarding claims 1, 23 and 47, Fazan teaches a method for forming a capacitor device comprising the steps of: forming a substrate 20 (col. 5, lines 15-42 and Fig. 2); forming a first interlayer dielectric layer 31 on said substrate 20 (col. 5, lines 15-42 and

Fig. 2); forming two or more contact plugs 30 through said first interlayer dielectric layer 31, said plugs 30 being separated from one another by a surface (col. 5, lines 15-42 and Fig. 2); forming a conducting layer 34 on said first interlayer dielectric layer 31 (col. 5, lines 42-65 and Fig. 3); producing an electrode 35 on alternate ones of said two or more contact plugs 30 by etching said conducting layer 34 (col. 6, lines 1-32 and Fig. 5); coating said electrodes 35 with a ferroelectric layer 40 (col. 6, lines 32-50 and Fig. 6); etching said ferroelectric layer 40 from said surfaces separating said contact plugs 30 (col. 7, lines 35-42 and Fig. 10); and creating additional electrodes 52 by filling spaces between said electrodes 35 on alternate ones of said contact plugs 30 with a conductive material 52 to establish electrical contact between the plugs and the electrodes (col. 7, lines 54-65 and Fig. 13).

Regarding claim 2, Fazan teaches wherein the step of forming said first interlayer dielectric layer 31 comprises forming said first interlayer dielectric layer of TEOS (col. 5, lines 15-42 and Fig. 2).

Regarding claim 3, Fazan teaches wherein the step of forming said first interlayer dielectric layer 31 comprises forming said first interlayer dielectric layer of silicon dioxide (col. 5, lines 15-42 and Fig. 2).

Regarding claim 6, Fazan teaches wherein the step of etching said ferroelectric layer 40 from said surfaces separating said contact plugs 30 comprises the step of applying a layer of hard mask material 36 to said conducting layer 34, applying a photolithographic layer to said layer of hard mask material 36, exposing said photolithographic layer, and developing said exposed photolithographic layer to

produce an etch pattern for said conducting layer 34 and said hard mask layer 36 (col. 6, lines 1-32 and Figs. 4-5).

Regarding claim 7, Fazan teaches wherein the step of coating said electrodes with a ferroelectric layer 40 comprises coating said electrodes with PZT (col. 6, lines 32-50 and Fig. 6).

Regarding claim 13, Fazan teaches applying a chemical mechanical polishing process to exposed surfaces of said electrodes and said ferroelectric layer 40 after the step of creating additional electrodes (col. 5, lines 65-67 and Fig. 13) .

Regarding claim 19, Fazan teaches wherein the step of coating said electrodes with a ferroelectric layer 40 comprises applying a layer of ferroelectric material having substantially uniform thickness along the length of the side faces of the electrodes coated by the ferroelectric layer (see Fig. 6).

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 4, 5, 8-12, 14-18 and 20-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fazan et al (US Pat No. 6,259,125) as applied to claims 1-3, 6, 7, 13, 19 and 47 above, and further in view of the Applicants' Admitted Prior Art.

Fazan does not teach forming the conductive layer comprises iridium or iridium oxide, first and second barrier layer comprises aluminum oxide, and etching the electrode so that adjacent electrode taper

However, Applicants' Admitted Prior Art teaches forming the conductive layer 19 comprises iridium or iridium oxide, first barrier layer 9 and second barrier layer 23 comprises aluminum oxide, and etching the electrode 19 so that adjacent electrode taper (see page 1 thru 2, and Fig. 1). At the time of the invention was made, it would have been obvious to a person of ordinary skill in the art to combine the first and second aluminum oxide barrier layer teaching of Prior Art with Fazan's vertical capacitor, because it would have reduced oxygen diffusion from the electrode as taught by Applicants' Admitted Prior Art, page 1 and page 2.

Conclusion

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Quoc Hoang whose telephone number is (703) 306-5795. The examiner can normally be reached on Monday-Friday from 8.00 AM to 5.00 PM.

If attempt to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Nelms can be reached on (703) 308-4910. The fax phone numbers of the organization where this application or proceeding is assigned are (703) 746-4016 for regular communications and (703) 746-4016 for After Final communications.

Art Unit: 2818

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

hy
Quoc Hoang
Patent examiner/AU 2818


David Nelms
Supervisory Patent Examiner
Technology Center 2800